

Embedded and Distributed Machine Learning for Prognostics Monitoring

Completed Technology Project (2017 - 2018)



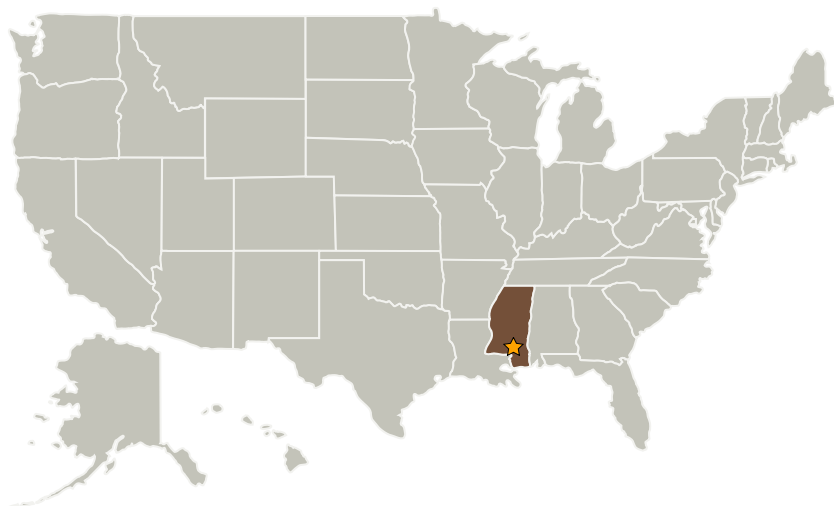
Project Introduction

Scheduled maintenance is inefficient and costly with no ability to take into account actual hardware degradation. The goal of this project is to develop a generic cost-effective embodiment that is relatively independent of the type of physical equipment being monitored by employing machine learning for prognostics monitoring. Prototype units will be developed with embedded novel machine learning algorithms for cryogenic equipment in the engine test complex as pilot demonstration systems. Energy harvesting technologies will also be integrated to further demonstrate low powered energy harvesting health monitoring capabilities.

Anticipated Benefits

Beyond the initially intended use in propulsion test facilities, the machine learning for diagnostics and prognostics has real applicability to support autonomy throughout NASA facilities and for missions employing autonomy in flight computing and robotic and system autonomy to handle failures and readapting when independent from Earth. This capability additionally has potential for missions that need to reduce the necessity for human intervention in maintaining equipment such as with Deep Space Missions.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
★Stennis Space Center(SSC)	Lead Organization	NASA Center	Stennis Space Center, Mississippi

Co-Funding Partners	Type	Location
Space Technology Mission Directorate(STMD)	NASA Mission Directorate	

Primary U.S. Work Locations
Mississippi

Project Website:

https://www.nasa.gov/directorates/spacetech/innovation_fund/index.html#.VC

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Stennis Space Center (SSC)

Responsible Program:

Center Innovation Fund: SSC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

Ramona E Travis

Principal Investigator:

Scott A Jensen

Co-Investigator:

Andrew K Bracey

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Technology Maturity (TRL)

Start: 2
Current: 4
Estimated End: 4



Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
 - └ TX13.4 Mission Success Technologies
 - └ TX13.4.5 Operations, Health and Maintenance for Ground and Surface Systems

Target Destinations

Earth, The Moon, Mars